# INTERNAL AECIA

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(WITH PLATE III)

Among the heteroecious rusts whose hosts grow in swampy situations is a form whose telial stage appears on species of *Scirpus* and whose aecial stage is developed upon one of the mints, *Lycopus virginicus* L. This rust, *Puccinia angustata* Peck,[1] is very abundant, during the month of May, in the vicinity of Auburn, Ala. The aecial sori may appear upon the stems, petioles and leaves, resulting in the hypertrophy of affected tissues. The enlargements upon the stems and petioles seem always to be more prominent than those upon the leaves. It was found upon sectioning the sori, which occurred upon both stems and petioles, that many of them not only possessed aecia which, upon dehiscence, liberate their spores to the exterior of the host, but also those which were entirely internal. In case the affected portions of the host are quite mature the pith cells will have disintegrated, causing the stem to be hollow, and the aecia then open into this cavity. If petioles or younger portions of the stem are affected, certain of the pith cells are broken down and the cluster cups open into the surrounding parenchyma tissue. As far as can be observed these internal cluster cups are similar in origin, structure, size and form to those which are erumpent at maturity. Masses of fungous tissue are present in certain places in which the aecia occur and the mycelium more or less densely ramifies throughout adjacent host tissues. These internal aecia may be so numerous that three or four will be present in a section ten micromillimeters in thickness.

The formation of aecia is usually subepidermal and when they are ready for anthesis they break through the epidermis. In the

[1] For this determination thanks are due Dr. J. C. Arthur, of Purdue University.

genus *Uredinopsis,* however, the aecia are indehiscent. It seems quite probable, moreover, that in genera which typically open to the exterior the occurrence of internal aecia is not at all uncommon and that this phenomenon has been previously observed by those who have studied rusts. Their occurrence in *Lycopus virginicus,* however, has not previously been recorded. Neither are there published accounts of their presence in other hosts so far as can be learned from the available literature relative to rusts. *Uromyces Caladii* (Schw.) Farl. is known[2] to form internal cluster cups in *Peltandra virginica* (L.) Kunth., and Reddick has observed them too in the fruits of the barberry. Not only it is probable that aecia quite commonly open within affected host tissues but also other stages of rusts as well. *Puccinia graminis* Pers. on rye bears uredinia, some of which liberate the uredospores into the interior of the hollow stems.[3]

A satisfactory explanation of the causes for the production of internal aecia cannot be given at this time further than to state that they must be the same as those which bring about the production of external aecia. In case the cluster cups of *P. angustata* originate near the center of the stem they must of necessity open within the stem. Those more deeply seated might push inward and open toward the center of the stem because there was less mechanical resistance than toward the outside. Rusts, whose spore forms are typically internal, depend upon the weathering away of overlying tissues for the liberation of the spores. The internal aecia of *P. angustata* are to be regarded, however, as the abnormal rather than as the typical condition and the surrounding host tissue cannot then serve this protective function.

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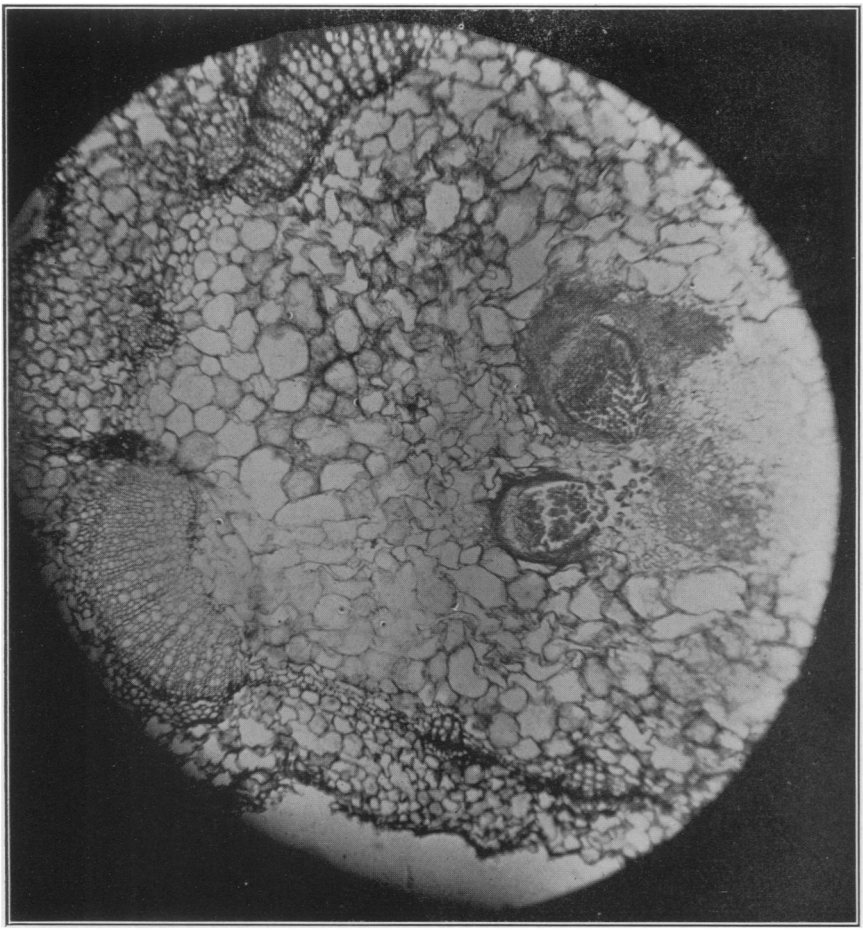
[2] This observation was made by Prof. G. F. Atkinson, Cornell University, Dr. C. W. Edgerton, La. Exp. Station, and Dr. Donald Reddick, Cornell University, from material collected at Ithaca, N. Y. Thanks are due the above gentlemen for this information so kindly given in letters.

[3] A preparation showing internal uredinia was loaned through the courtesy of Dr. Donald Reddick, Cornell University.



AECIA OF PUCCINIA ANGUSTATA WITHIN THE STEM OF LYCOPUS VIRGINICUS